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ABSTRACT

The paper reviews and critiques research on incidental language teaching, a method which refers to interactions between an adult and a child that arise naturally in an unstructured situation and that are used systematically by the adult to transmit new information or give the child practice in developing a communication skill. Studies of this approach and implications of its use with children who are developmentally or language delayed are discussed. The theoretical reasons why incidental teaching might be expected to be effective are briefly discussed and studies evaluating its general effects are noted. Three conclusions are cited from the research: incidental teaching (1) teaches target skills effectively in the natural environment; (2) typically results in generalization of those skills across settings, times, and persons; and (3) results in gains in the formal functional, and possibly the strategic aspects of language. Future research should focus on analyses of general effects, analyses of how these effects are influenced by individual differences among subjects, and ways that incidental teaching technology can be systematically utilized within the education system and with parents. (CL)

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INCIDENTAL LANGUAGE TEACHING: RESEARCH AND CLINICAL PERSPECTIVES[1]

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ABSTRACT

Incidental language teaching refers to interactions between an adult and a child that arise naturally in an unstructured situation and are used systematically by the adult to transmit new information or give the child practice in developing a communication skill. The purposes of this paper are to review and critique current research on incidental language teaching, briefly discuss the theoretical reasons why incidental teaching might be expected to be effective, and to discuss directions for future research on this teaching approach with children who are developmentally or language delayed.

The search for effective language intervention strategies has been a central theme in basic and applied research during the past 25 years. In recent years, there has been increasing interest and research on more "naturalistic" approaches to training. These approaches have been referred to using a variety of terms including "milieu training", (Hart & Rogers-Warren, 1978), "naturalistic training", (Hart, 1985), "transactional training" (McLean & Synder-McLean, 1978), and "conversational training", (MacDonald, 1985). The common premises that connect these intervention techniques are: (1) that language and communication skills should be taught in the child's natural environment, (2) in conversational contexts, (3) utilizing a dispersed trials training approach that (4) emphasizes following the child's attentional lead and (5) using functional reinforcers indicated by child requests and attention. The impetus for developing and investigating these procedures has come from two sources: growing evidence of the major role of routine conversational interactions in normal language acquisition (Bruner, 1978; McCormick & Schiefelbusch, 1984), and limitations of the more traditional, one-to-one massed trial training approach in achieving reasonable generalization (Harris, 1975; Warren & Rogers-Warren, 1980; Mahoney & Seeley, 1976; Costello, 1983; Johnston, 1982; Reichle & Keogh, 1985).

One "naturalistic" approach that appears to have potential for remediating the language deficits of persons with developmental delays or mental retardation is incidental teaching. The purposes of this paper are to define and describe incidental teaching, review and critique research on incidental language training, briefly discuss the theoretical basis of incidental teaching, and, finally, to discuss major unresolved research issues and questions as they relate to children with mental retardation.

Definition of Incidental Language Teaching

"Incidental teaching" refers to the interactions between an adult and a child that arise naturally in an unstructured situation, such as free play, and that are used systematically by the adult to transmit new information or give the child practice in developing a communication skill (Hart & Risley, 1975, p.411). The child controls the incidences in which teaching occurs by signaling interest in the environment. The child often initiates interaction by requesting assistance from the adult[3]. Comments and directions from the child can also initiate an incidental teaching episode (Hart & Risley, 1982). The child's initiation may be verbal or nonverbal. By indicating what is of prepotent interest to him, the child provides the topic and the opportunity for the adult to teach new language forms. Incidental teaching as language intervention involves: (a) arranging the environment to increase the likelihood that the child will initiate to the adult, and thus, will provide incidences for teaching; (b) selecting language targets appropriate for the child's skill level, interest, and the opportunities the environment provides; (c) responding to the child's initiations with requests for elaborated language resembling the targeted forms; and (d) reinforcing the child's communicative attempts as well as use of specific forms with attention and access to the objects in which the child has expressed an interest. Incidental teaching episodes are brief, positive, and oriented toward communication rather than language teaching *per se*. In these ways, incidental teaching resembles teaching that naturally occurs in mother-child dyadic interaction (Moerk, 1983; Schacter,

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[3] Although incidental teaching starts with a child initiation, and thus, is described as child-controlled, the adult's attention and response to child communicative behavior are equally important in determining an incidental teaching episode.

1979). Incidental teaching differs from naturally occurring teaching in two important ways: (a) general classes of communication or language targets are pre-selected for teaching, and (b) a sequence of increasingly specific prompts are employed to ensure the child's use of the pre-selected targets[4]. Incidental teaching incorporates learning principles and relies on techniques such as modeling, shaping, and reinforcement to teach new language in naturalistic conversational settings.

Why Incidental Teaching Should Be Effective

Incidental teaching should be effective from at least two perpsectives, behavioral and developmental. From a behavioral perspective, incidental teaching incorporates several training techniques known to be effective in teaching language skills: shaping, prompting, and contingent reinforcement (cf Lovaas, 1977). It utilizes the "loose teaching," the "programming common stimuli," and the "multiple exemplars" approaches recommended by Stokes and Baer (1977) as means of facilitating generalization. Because it occurs in the contexts in which language is to be used and the cues are similar to those the child will encounter in typical conversations, generalization is more likely. In addition, incidental teaching promotes use of two specific learning strategies. First, imitation as a means of attending to and potentially integrating new words with events is prompted

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[4] There is some evidence that mothers employ a sequence of increasingly specific prompts and contingent reinforcement (Moerk, 1983; Kaiser & Blair, 1985). Incidental teaching interventions are more specifically systematic in the sequence of prompts and, probably, use reinforcement and feedback in a more contingent fashion. Naturally occuring teaching and systematic incidental teaching differ in degree of specificity but not in the general nature of the interaction.

and reinforced. Second, cross-modal transfer (spontaneous production of previously heard utterances) may be established through processes associated with generalized imitation (Kaiser & Warren, in press). Repeated presentation of linguistically appropriate models when the child's attention is focused on the immediate context teaches the child to attend to the words others say about objects and events. Practice responding to formal models in naturalistic interactions may facilitate attention to and learning from models presented informally.

From a developmental perspective on interaction and language learning, incidental teaching contains some of the elements assumed to be critical for successful language learning in conversational contexts (Hart, 1985). The trainer follows the child's lead and teaches to his interests and intentions (Schacter, 1979; Bruner, Roy, & Ratner, 1980). The establishment of contiguity between the child's attention to an event and its linguistic representation by the trainer may be especially critical (Whitehurst, 1979; Hoff-Ginsberg & Schatz, 1982). In addition, the selection of appropriate targets for teaching insures that there will be a communicative match between the trainer's language and expectations and the child's abilities. Establishment of such a match in conversations with children may be especially facilitative of their language learning (Mahoney & Seeley, 1976). Incidental teaching promotes increases in frequency of talking. Since children who talk more frequently tend to develop complex language more rapidly, increases in rate of talking may also facilitate language development (Nelson, 1973; Hart, 1981).

Equally important from both behavioral and developmental perspectives is the fact that incidental teaching focuses on communication. In incidental

teaching, as in natural mother-child interaction, the consequences for talking are functional ones: control of the environment, continued interaction with an adult, and realization of the child's communicative intentions.

Applications of Incidental Teaching

Incidental teaching as described here has been applied experimentally in a series of studies by Hart and Risley (1968, 1974, 1975, 1980). In these studies, incidental teaching involved the careful arrangement of the environment to encourage child requests for assistance (for example, attractive toys were placed on a shelf in view, but out of the reach, of a young child). When the child initiated to the adult, indicating interest in the toys, by reaching for them, by vocalizing, calling the adult's name, or asking for a toy, the adult responded to the child with an appropriate cue for language. The most natural cue the adult consistently provided was her physical presence, focused attention on the child, and a questioning look. This nonverbal cue resembles the conversational cues that typically prompt language behavior (Hart, 1985). If the child did not respond within a few seconds, a verbal cue, such as a question, was introduced. Verbal cues varied according to the particular situation, the child's ability level, and what the adult wished the child to learn. Depending on a child's language skill and knowledge of the particular event, additional cues were needed. At first, children sometimes imitated complete sentences modeled by the trainer. Subsequently, partial models or simply a request for the terminal behavior ("ask me in a sentence") were sufficient to prompt elaborated language.

In incidental teaching, the child's attention is focused on his need for

assistance and the adult as a means for meeting that need. The adult ensures that the child will respond by selecting a terminal language behavior the child can produce, with help as needed. The incidental teaching episode is kept brief. If the child cannot or will not respond after two prompts, the adult helps the child in whatever way the child has indicated, typically by providing the material or assistance the child desires. When the child responds to prompts, the adult affirms the correctness of his response and provides the material or assistance contingent upon the child's elaborated verbal request.

Variations in the incidental teaching procedure have typically involved providing a smaller range of more directive prompts to encourage child initiations rather than waiting for spontaneous initiations. Adaptations of the procedure have been investigated by Rogers-Warren and Warren, 1980; Warren, McQuarter, and Rogers-Warren, 1984; Alpert and Rogers-Warren, 1984; Halle, Marshall, and Spradlin, 1979; Halle, Baer, and Spradlin, 1981; Cavallero and Bambara, 1982; Oliver and Halle, 1982; McGee, Krantz, Mason, and McClannahan, 1983; McGee, Krantz, and McClannahan, 1983; Neef, Walters, and Egel, 1984.

For example, Rogers-Warren and Warren (1980) prompted language delayed children's verbal responses by manding or instructing the children to verbalize to obtain preschool materials rather than depending only on children's initiations as incidences for teaching. When children approached teachers or materials, teachers prompted with "Tell me what you want." Halle et al. (1979) investigated the use of a type of nonverbal prompt, a brief time delay during which adults focused their attention closely on the child while withholding a desired object, to cue children to initiate language. Alpert and Rogers-Warren (1984) used child-cued

modeling (directly prompting children to imitate while the children focused their attention on toys or other attractive materials) in addition to incidental teaching, mands, and time delay, to prompt children to verbalize. Each of the variant applications followed the general form of incidental teaching: brief, positive interactions oriented toward communication, targeted on pre-selected language responses, and child-specified reinforcers provided contingent on language use.

Research on Incidental Language Teaching

The positive effects of incidental teaching procedures on targeted child responses have proven to be consistent across a range of linguistic responses, for children of widely varying skills, and when applied by teachers, institutional staff, and parents. The effectiveness of incidental teaching was demonstrated with disadvantaged preschoolers in the series of studies by Hart and Risley (1968; 1974; 1975; 1980). Hart and Risley (1968) showed that while traditional group language training methods failed to produce generalized usage in other situations, incidental teaching resulted in significant increases in the use of target language in situations where the teaching procedures were not in effect. Hart and Risley (1974) employed a multiple baseline design across three language categories (nouns, adjectives, and compound sentences) to demonstrate the effectiveness of incidental teaching. A third study (Hart & Risley, 1975) replicated the findings of the earlier studies and added evidence that specific instructions and continued prompts were not necessary to generate a variety of language responses or to maintain the use of incidentally taught language, and that incidentally trained language can be generalized readily to peers as well as other adults. Hart and Risley (1980) reanalyzed data obtained in their 1975 study and compared data obtained

during incidental teaching with longitudinal data on two comparison groups of preschool children (a group of middle-class children attending a university preschool and a group of children attending an inner city Headstart program). Hart and Risley found that incidental teaching resulted in very substantial increases in the frequency of language use and vocabulary growth. Disadvantaged children who had received the incidental teaching intervention showed acceleration in their rates of learning and using new language. After training, language use by the experimental group resembled that observed in advantaged university preschool children.

Two studies investigating an adapted version of incidental teaching called the mand-model procedure have shown this technique to be effective with language delayed preschoolers. Rogers-Warren and Warren (1980) reported accelerated generalization of previously trained words and grammatical structures to the classroom when the mand-model procedure was introduced in a classroom free play setting. Subjects' rates of verbalization doubled to tripled from their baseline levels and substantial increases in vocabulary and complexity of utterances were observed. Warren, McQuarter, and Rogers-Warren (1984) taught single and multi-word utterances to language delayed preschoolers using the mand-model technique. Increases in rate of subject initiations, responsiveness to adult initiations, and increases in overall complexity to subjects' language were noted during training. Correlated increases were observed in a second classroom setting where the experimental procedures were not in effect and these increases were maintained when the incidental teaching was faded out in the intervention setting.

Halle et al. (1979) successfully applied another adaptation of incidental teaching (the time delay procedure) to increase verbal

initiations by six institutionalized mentally retarded adolescents. Brief delays with focused attention were used to prompt children to ask for their food trays. Training at breakfast was sufficient to result in generalization to other mealtimes and people other than the staff who had conducted the training. Halle et al. (1981) reported that when teachers used the delay procedure to teach specific requests to six developmentally delayed preschool children, the frequency of child verbal initiations increased in the training situations and generalization contexts as well. No measures of changes in the complexity of subjects' utterances were taken. Interestingly, the trained teachers were observed to generalize their use of the time delay procedures to untrained routine interactions.

Other studies of variations of the incidental teaching procedure have shown similar results. Cavallaro and Bambara (1982) demonstrated that incidental teaching was more effective than a question plus labeling procedure in increasing rates of two-word requests in a language delayed preschooler. Oliver and Halle (1982) taught a retarded child to initiate appropriate signs using incidental teaching and reported generalization to a second trainer and novel opportunities. McGee et al. (1983a) taught receptive labels to autistic adolescents and reported rapid acquisition and generalization across settings and times of the day. Finally, Alpert and Rogers-Warren (1984) trained mothers as incidental teachers of their language delayed preschoolers. Generalized changes in children's language were seen in the form of increases in frequency of talking, complexity of utterances, and intelligibility.

Four aspects of the results obtained from experimental application of incidental teaching are significant. First, the effects on specific targeted language responses have been consistently strong and immediate

across a range of subject and experimenter populations (preschool disadvantaged, language delayed, mentally retarded, adolescent autistic, severely retarded subjects; teacher, parent, and institutional staff experimenters), and a range of language responses (labels, adjectives, general requests, one and two word utterances, yes and no responses, compound sentences, specific requests). Second, there has been evidence of generalization across settings in each study in which this type of generalization was assessed (Hart & Risley, 1974, 1975; Warren et al. 1984; Halle et al., 1979; Halle et al., 1981; Alpert & Rogers-Warren, 1984; Cavallaro & Bambara, 1983; McGee et al., 1983a). Third, except for the study by Cavallaro and Bambara (1982), every study in which frequency of subjects' initiations and responsiveness has been measured has reported increases in these two dimensions of language use (Halle et al., 1981; Warren et al., 1984; Hart & Risley, 1980). Finally, studies that have measured the linguistic aspects of language use (typically complexity and vocabulary size were the aspects measured) have reported at least modest gains (Hart & Risley, 1975; 1980; Rogers-Warren & Warren, 1980; Warren et al., 1984; Alpert & Rogers-Warren, 1984).

Although the primary and generalized results of applications of incidental teaching are consistent in indicating the effectiveness of the teaching paradigm, research with mentally retarded subjects is too limited to determine if incidental teaching procedures produce strong, consistent general effects on this population's language learning and performance. To determine if incidental teaching is a viable remediation technique for retarded persons, evaluation of the general effects on their language and communication is needed.

The General Effects of Incidental Teaching

Two types of evidence are necessary to demonstrate that incidental teaching is an effective language remediation strategy with mentally retarded individuals. First, there must be evidence that the primary effects of incidental teaching can be demonstrated consistently with this population. Second, to be deemed an effective remediation strategy, there must be empirical evidence that applications of incidental teaching result in significant changes in the general communication repertoire of the individual.

The issue of what constitutes remediation of a pervasive communication deficit is not widely discussed in current language intervention literature. Demonstrations of general effects would require evidence that formal, functional and strategic components of the communication system have been positively effected by the intervention. Communication depends on a formal system for expressing social intentions or functions. In order to acquire the formal and functional aspects of the communication system, children must have viable learning strategies that are applied in everyday learning situations. Remediation of general language deficits must include: significant changes in the formal system for communication; evidence of increased expression of social intention and functional use of the expanded formal system; and, implicitly, changes in the strategy employed in learning from natural contexts. Acquisition of specifically trained forms alone does not constitute evidence of significant remediation of a language deficit. Generalization across settings, persons and response classes is necessary, but still not sufficient evidence of remediation by these criteria. Evidence of remdiation should be reflected in increases in rate of acquisition and use of new forms in functional

attributable to the immediate effects at direct teaching to the extent that a change in the efficiency of learning strategy can be assumed.

Based on this logic, a three fold criteria for evaluating the general effects of incidental teaching consists of: 1) significant increases in the range of formal means of communication (e.g., syntax and vocabulary); 2) changes in the social use of language (i.e., increased functional communication); and 3) implicit evidence of changes in the child's learning strategy suggesting that new forms and functions are being acquired and generalized more quickly than prior to the intervention. Few interventions with mentally retarded persons have been evaluated in terms of these generalized types of change or in terms of the general effects of the teaching procedures. While such stringent criteria have not been applied in the past, application of these criteria in evaluating an emerging technique for widespread application seems appropriate, considering the nature of language and its role in social interaction, academic learning and general cognitive functioning.

Three studies have investigated incidental teaching with mentally retarded subjects (Halle et al., 1979; Halle et al., 1981; Oliver & Halle, 1982). In the first study, (Halle et al., 1979) severely retarded adolescents were taught to request trays during breakfast in an institutional setting. In a second study (Halle et al., 1981), preschool retarded children were taught to request various objects and assistance throughout the preschool day. The study focused on training teachers. Only a limited analysis of the effects on subjects' language other than the trained forms was provided. Oliver and Halle (1982) taught a retarded

subject to initiate signs to request objects and assistance. All three studies focused on very limited language targets, consisting almost entirely of simple requests. Generalization across settings was reported in each study. No analysis of the general effects of the procedure on subjects' communication was presented in the Halle et al. (1979) study. Positive effects on frequency of child initiations were reported in the Oliver and Halle (1982) and Halle et al. (1981) studies. Given the limited set of intervention targets in these studies, it seems unlikely that broad general effects would have been demonstrated.[5]

The strongest evidence of general effects on the communication system comes from the experimental application of incidental teaching with culturally disadvantaged (Hart & Risley, 1974, 1975, 1980) and language delayed children (Rogers-Warren & Warren, 1980; Alpert & Rogers-Warren, 1984; Warren et al., 1984). Positive effects on all three dimensions of the language system (form, function, and learning strategy) have been reported. Increases in the use of targeted linguistic forms has been shown to be a primary result of all experimental applications of incidental teaching. Generalized changes in use of linguistic forms have been reported by Rogers-Warren and Warren (1980) (previously trained forms were shown to generalize to the classroom when incidental teaching was applied in that setting) and by Warren et al., (1984) (children's mean length of utterance (MLU) increased following incidental teaching). Hart and Risley (1974, 1975) reported increases in novel examples of the

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[5] Three studies have investigated the effects of incidental training procedures with children who were identified as autistic and severely developmentally delayed (McGee, et al., 1983a; McGee et al., 1983b; Neef et al., 1984). Like the studies with mentally retarded subjects, these investigations focused on very limited language targets.

classes of language forms trained via incidental teaching. By excluding prompted exemplars of the trained forms from their analysis, Hart and Risley were able to separate the generalized effects of the intervention from the direct effects. Hart and Risley (1968) reported acquisition of receptive color names after incidentally teaching productive use of color names. Alpert and Rogers-Warren (1984) reported significant changes in MLU, upperbound (i.e., longest utterance in a speech sample) novel words produced and total words produced by six language delayed preschoolers following incidental teaching by their mothers, suggesting that the intervention may have had quite general effects on these subjects' use of linguistic form.

Evidence supporting changes in language learning strategy as a result of incidental teaching is indirect. Hart and Risley's (1980) comparative analysis of subjects receiving incidental teaching with other disadvantaged children enrolled in a Headstart classroom and with middle class children in a university preschool, showed accelerated acquisition of new vocabulary and of elaborated language by the experimental group, to the extent that they were comparable to the middle class group by the end of the school year. In Alpert and Rogers-Warren (1984), comparisons of linguistic data at three points (end of baseline, end of intervention, and last maintenance check three months after training was completed) suggested that some subjects were acquiring new forms more rapidly during the last phase (between the end of training and the maintenance check) than they were during the early phase (between the end of baseline and the end of training). The linguistic data were too limited to prove this, and the effect was evident for only four of six subjects. Accelerated generalized use of previously trained forms was evident in the study by Rogers-Warren and Warren (1980). Increasing generalization may indicate application by a

child of strategy learned through the incidental teaching intervention. Maintenance data reported by Hart and Risley (1974), Warren et al., (1984), and Alpert and Rogers-Warren (1984) also suggest that subjects may have acquired strategies that they continue to apply after training is discontinued. Improved rates of initiations and responsiveness, sustained use of the trained classes of language behaviors, and in some cases, continued acquisition of novel forms have been reported.

Because the studies with mentally retarded subjects have been more limited in scope of training targets and analysis of generalized effects, it is impossible to compare the effects of incidental teaching with language deficient children with those obtained for mentally retarded children. It appears that general effects may be less pervasive with retarded subjects. However, in every case, the intervention itself was more limited than the long term interventions oriented toward broader classes of language behavior that have been carried out with language delayed children.

Also missing from the current literature on incidental teaching is a careful analysis of individual effects within a class of subjects. Hart and Risley's studies generally reported data for groups of 10 or more children, although the subjects represented a range of IQ and language skills. Hart and Risley (1975) did include data for individual subjects and these data suggested consistent effects across children. However, descriptions of individual subjects were not provided along with the individual data. Studies by Rogers-Warren and Warren, and studies by Halle and his colleagues, which are all single subjects designs, do report differences across subjects; but a pattern of effects is difficult to ascertain largely because comparable independent measures of subjects'

language, social, and cognitive skills prior to training (for example, standardized tests) have not been reported. When differences in magnitude of effect have been noted, it is not apparent how these differences relate to characteristics of the subjects, such as their receptive knowledge of the skills being trained or their particular language production deficits.

In summary, incidental teaching appears to be a very promising language intervention technique that may affect subjects' communication repertoires in some important general ways. It is clear from existing literature that incidental teaching: (a) teaches target skills effectively in the natural environment, (b) typically results in generalization of those skills across settings, time and persons, (c) and results in gains in the formal functional, and possibly the strategic aspects of language. Because research with mentally retarded children is limited in both quantity and scope, the extent to which incidental teaching can remediate serious communication deficits in this population is less clear.

Future Research Directions

Analysis of the effects of incidental teaching techniques on language learning is a relatively new research topic. With the exception of three studies by Hart and Risley (1968, 1974, 1975) all research in this area here has been published since 1979. Milieu language teaching as a model of intervention incorporating incidental teaching was first proposed by Hart and Rogers-Warren in 1978. Considerable research is still needed to determine the efficacy of incidental language teaching with severely language deficient persons. Research describing the range of effects achievable through this instructional approach is needed together with development of a technology for implementing an incidental teaching model within the confines of the present educational system.

Analyses of General Effects

Given the promising results from research with language delayed children and the generalization across settings reported in the limited analyses with mentally retarded subjects, it seems especially timely to extend the analysis of incidental teaching with mentally retarded subjects to an analysis of general effects. Evidence of general effects might be seen in increases in vocabulary, changes in receptive language skills, increases in the complexity of language use, and frequency of using language. However, the most convincing evidence for a general remediation effect would be an acceleration in the subject's rate of learning new language skills. Evidence accumulated in naturalistic settings from spontaneous conversation samples might be more convincing than evidence gleaned from tests of language ability, although both types of evidence would be useful in demonstrating a facilitative effect of training. In any case, a broad conceptualization of generalization and its measurement is necessary to determine whether incidental teaching affects the form of children's language system, the communicative functions expressed, and their strategy for acquiring new language as well as the frequency of their communication attempts.

Analyses of Individual Differences

Analysis of individual differences is a critical aspect of determining the effectiveness of incidental language training. Research with range of children who are moderately to severely mentally retarded is needed to determine what, if any constraints, intellectual abilities place on the

effects of this intervention approach. Incidental teaching may be less efficient and effective than didactic, massed trial training approaches with children who have severe intellectual deficits and who exhibit poor natural learning strategies. Studies analyzing the primary, generalized, and general accelerative effects of incidental teaching on the language learning of moderately and severely mentally retarded children as well as analyses comparing traditional didactic and incidental teaching approaches are needed.

Individual differences should also be examined with subjects functioning at the same general level of intellectual functioning but evidencing different language development patterns. Basically, incidental teaching targets production of functional language. It should be most effective for subjects whose productive language skills lag behind their receptive skills. Receptive language is typically more advanced than production. Thus, if the adult is teaching slightly ahead of the child's current productive skills, prompts and feedback will be directed toward forms children already have in their receptive repertories. Subjects whose receptive language skills are more deficient than their productive skills may show greater gains from incidental teaching than subjects whose receptive and productive language delays are of a similar magnitude. Mentally retarded children frequently have delays in receptive and productive language development greater than their equivalent mental age (MA) (c.f., Bartel, Bryen, & Keehn, 1973; Lovell, 1968; McLeavey, Toomey, & Dempsey, 1982; Lombardino & Sproul, 1984; Miller & Chapman, 1984). The specific effects of incidental language teaching on children functioning at the same intellectual level but with different language development profiles are difficult to predict. To date, there are almost no data on the differential effects of language intervention resulting from individual

differences (Friedman & Friedman, 1980; Chapman, 1981; Rosenberg, 1982).

Applications of Incidental Teaching Technology

There are many applied questions to be answered in order to develop a feasible technology for incorporating an incidental teaching approach into typical special education service delivery systems. In a number of respects, incidental teaching is the antithesis of the more traditional one-to-one speech therapy approaches. To be effective, incidental teaching must be integrated into the regular classroom routines so that teaching incidents occur frequently enough to insure sufficient trials for new skills to be learned. Incidental teaching can be programmed most easily into relatively unstructured conversationally-oriented periods of the school day. Such periods are frequent in preschools but less readily available in primary grade classrooms. In the latter case, systematic application of incidental teaching as a primary form of language intervention or as an adjunct to one-to-one training may require changes in the physical arrangements of the classrooms, the scheduling of activities, and the general instructional model.

Research is needed to develop effective models for including incidental teaching in the curricula of mainstreamed special education classrooms. Integration of incidental teaching into complementary curriculum models[6] and supported environmental designs need to be tested. Methods of training teachers to be effective incidental teachers in one-to-one and group situations must be developed. Criteria for determining the

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[6] A recently developed general curriculum model known as "individual curriculum sequencing" (Mulligan & Guess, 1984) is one complementary approach.

behavioral attributes of a "good" incidental language teacher will require empirical analyses. Finally, effective training materials and in-service approaches need to be field tested and the results of these efforts disseminated to teachers and speech-language therapists.

Parents are ideal candidates to be effective incidental language teachers, a role they typically fulfill quite successfully with normal young children. However, only one study (Alpert & Rogers-Warren, 1984) has examined training parents to be incidental language teachers for their own children. Research on procedures for training parents as incidental language teachers is needed together with analyses of child learning and generalization by parent and child resulting from parent-implemented incidental teaching.

No specific assessment procedures relative to incidental language training have yet been proposed. Valid, reliable procedures are needed for determining the specific incidental teaching techniques or combinations of techniques to use with a particular child in specific circumstances to teach a particular target skill. Decision-making procedures should be based on empirical research, however, specific analyses of the application of decision rules will be needed as well.

To date only one study has examined incidental teaching of signs (Oliver & Halle, 1982). Further research on procedural adaptations for using incidental teaching in sign training or with communication boards and other augmentative devices is also needed.

If incidental teaching approaches are to be assimilated into the existing collection of special education instructional models, research on related issues is also needed. Determing the relative cost-effectiveness of this teaching approach is a first step. Studies comparing specific models of language intervention must be conducted. Large scale analyses of

short and long term outcomes for students with varying language deficits or delays will be needed, but such studies will be dependent on the smaller scale more intensive analyses of interventions with individuals exhibiting various language profiles as suggested earlier.

Adapting an incidental teaching approach has major implications for the role of speech-language therapists in education systems (Warren & Rogers-Warren, 1985). To fully institute an incidental teaching model, the speech/language therapist may need to become primarily a parent and teacher trainer. She would likely only conduct isolated one-to-one training under special circumstances. She is likely to continue to conduct diagnostic assessments, track child progress, determine training goals in consultation with others, design intervention procedures and monitor and adjust training programs. She will be cast more in role of expert, consultant, and case manager and less in the role of direct trainer.[7] Meanwhile the classroom teaching staff will take on more direct responsibility for language develoment and training. Implications of these changes need to be carefully examined to determine the feasibility of actually instituting an incidental teaching model in the ensuing educational systems.

Conclusion

Remediating language deficits of mentally retarded children is one of the most challenging problems faced by researchers, teachers, and clinicians. Efforts to date have resulted in a technology for direct instruction that successfully teaches new forms of language in controlled settings, but which has not produced thorough generalization of newly trained forms in naturalistic interactions. Recent research on incidental

[7] A "consultation model" for speech and language intervention has been described in detail by Frassinelli, Superior, & Meyers (1983).

language teaching has shown it to be a promising language intervention techinque that may affect subjects' communication repertoires in some important general ways. Research is now needed to determine the parameters of its effects with mentally retarded children, how its effects are influenced by individual subject differences, and on ways to systematically utilize this approach within the present education system and with parents.

References

Alpert, C.L., & Rogers-Warren, A. K. (1984). Mothers as incidental language trainers of their language-disordered children. Unpublished manuscript, University of Kansas.

Bartel, N. R., Bryen, D., & Keehn, S. (1973). Language comprehensioin in the moderately retarded child. Exceptional Children, 40, 375-382.

Bruner, J. S. (1978). Learning the mother tongue. Human Nature, September, 42-49.

Bruner, J. Roy, C., & Ratner, N. (1980). The beginnings of requests. In K. E. Nelson (Ed.), Children's Language (Vol. 3). New York: Gardner Press.

Cavallaro, C. C., & Bambara, L. (1982). Two strategies for teaching language during free play. Journal of the Association for the Severely Handicapped, 1, 80-93.

Chapman, R. (1981). A clinical perspective on individual differences in language acquisition among mentally retarded children. Paper presented at the biennial meeting of the Society for Research in Child Development, Boston, MA.

Costello, J. M. (1983). Generalization across settings: Language intervention with children. In J. Miller, D. E. Yoder, & R. L. Schiefelbusch (Eds.), Contemporary issues in language intervention. Rochelle, MD: American Speech-Language-Hearing Association.

Frassinelli, L., Superior, K., & Meyers, J. (1983). A consultation model for speech and language intervention. ASHA, 24, 25-30.

Friedman, P., & Friedman, K. (1980). Accounting for individual differences when comparing the effectiveness of remedial language teaching methods. Applied Psycholinguistics, 1, 151-170.

Halle, J. W., Baer, D. M., & Spradlin, J. E. (1981). Teacher's generalized use of delay as a stimulus control procedure to increase language use in handicapped children. Journal of Applied Behavior Analysis, 14, 387-400.

Halle, J. W., Marshall, A. M., & Spradlin, J. E. (1979). Time delay: A technique to increase language use and facilitate generalization in retarded children. Journal of Applied Behavior Analysis, 12, 431-440.

Harris, S. L. (1975). Teaching language to nonverbal children—with emphasis on problems of generalization. Psychological Record, 82, 565-580.

Hart, B. (1981). Pragmatics: How language is used. Analyses and Intervention in Developmental Disabilities, 1, 299-313.

Hart, B. (1985). Naturalistic language training strategies. In S. F. Warren & A. Rogers-Warren (Eds.) Teaching Functional Language. Austin, TX.: Pro-Ed.

Hart, B., & Risley, T. R. (1968). Establishing the use of descriptive adjectives in the spontaneous speech of disadvantaged preschool children. Journal of Applied Behavior Analysis, 1, 109-120.

Hart, B., & Risley, T. R. (1974). Using preschool materials to modify the language of disadvantaged children. Journal of Applied Behavior Analysis, 7, 243-256.

Hart, B., & Risley, T. R. (1975). Incidental teaching of language in the preschool. Journal of Applied Behavior Anaylsis, 8, 411-420.

Hart, B., & Risley, T. R. (1980). In vivo language training: Unanticipated and general effects. Journal of Applied Behavior Analysis, 12, 407-432.

Hart, B. & Risley, T. R. (1982). How to use incidental teaching for elaborating language. Lawrence, KS: H & H Enterprises, Inc.

Hart, B. & Rogers-Warren, A. K. (1978). A Milieu Approach to Teaching Language. In R. L. Schiefelbusch (Ed.) Language Intervention Strategies. Baltimore: University Park Press.

Hoff-Ginsburg, E., & Schatz, M. N. (1982). Linguistic input and the child's acquisition of language: A critical review. Psychological Bulletin, 92, 3-26

Johnston, J. R. (1982, June). Generalization: The nature of change. Invited address to the symposium on Child Language Disorders, University of Wisconsin, Madison.

Kaiser, A. P., & Blair, G. (1985). Interactional strategies of mothers with normal and mentally retarded children. Unpublished manuscript. Vanderbilt University, Nashville, TN.

Kaiser, A. P. & Warren, S. F. (in press). Pragmatics and generalization. In R. L. Schiefelbusch (Ed.), Communicative Competence. Boston: College-Hill Press.

Lombardino, L. J., & Sproul, C. J. (1984). Patterns of correspondence and non-correspondence between play and language in developmentally delayed preschoolers. Education and Training of the Mentally Retarded, 19, 5-15.

Lovaas, O. I. (1977) The autistic child: Language development through behavior modification. New York: Plenum Press.

Lovell, K. (1968). Some recent studies in cognitive and language development. Merrill-Palmer Quarterly, 14, 123-138.

Mahoney, G. J., & Seely, P. B. (1976). The role of social agent in language acquisition: Implications for language intervention. In N. R. Ellis (Ed.), International research in mental retardation (Vol. 8). New York: Academic Press.

McCormick, L. & Schiefelbusch, R. L. (1984). Early Language Intervention. Columbus, Ohio: Charles E. Merrill.

McGee, G. G., Krantz, P. J., Mason, D., & McClannahan, L. E. (1983a). A modified incidental-teaching procedure for autistic youth: Acquisition and generalization of receptive object labels. Journal of Applied Behavior Analysis, 18, 329-338.

McGee, G. G., Krantz, P. J. & McClannahan, L. E. (1983b). The facilitative effects of incidental teaching on proposition use by autistic children. Journal of Applied Behavior Analysis, 18, 17-31.

McLean, J. E. & Snyder-McLean, L. (1978). A Transactional Approach to Early Language Training. Columbus, Ohio: Charles E. Merrill.

McLeavey, B. C., Toomey, J. F., & Dempsey, P. (1982). Nonretarded and mentally retarded children's control over syntactic structures. American Journal of Mental Deficiency, 86, 485-494.

Miller, J. F., & Chapman, R. S. (1984). Disorders of communication: Investigating the development of language of mentally retarded children. American Journal of Mental Deficiency, 88, 536-546.

Moerk, E. L. (1983). The mother of Eve as a first language teacher. Norwood, NJ: Ablex Publishing.

Mulligan, M. & Guess, D. (1984). Using an individualized curriculum sequencing model. In McCormick, L. & Schiefelbusch, R. L. Early Language Intervention. Columbus, Ohio: Charles E. Merrill.

Nelson, K. (1973). Structure and strategy in learning to talk. Monographs of the Society for Research in Child Development, 38,(#1-2, Serial No. 149).

Oliver, C. B., & Halle, J. W. (1982). Language training in the everyday environment: Teaching functional sign use to a retarded child. Journal of the Association for the Severely Handicapped, 8, 50-62.

Reichle, J. & Keogh, W. J. (1985). Communication intervention: A selective review of what, when and how to teach. In Warren, S. F. & Rogers-Warren, A. K. (Eds.) Teaching Functional Language. Austin, TX.: Pro-Ed.

Rogers-Warren, A., & Warren, S. (1980). Mands for verbalization: Facilitating the display of newly-taught language. Behavior Modification, 4, 361-382.

Rosenberg, S. (1982). The language of the mentally retarded: Development, progress, and intervention. In Rosenberg, S. (Ed.), Handbook in applied psycholinguistics. Hillsdale, NJ: Lawrence Earlbaum Associates.

Schachter, F. F. (1979). Everyday mother talk to toddlers: Early intervention. New York: Academic Press.

Stokes, T. F., & Baer, D. M. (1977). An implict technology of generalization. Journal of Applied Behavior Analysis, 10, 349-367.

Warren, S. F., McQuarter, R. J., & Rogers-Warren, A. K. (1984). The effects of mands and models on the speech of unresponsive socially isolate children. Journal of Speech and Hearing Disorders, 47, 42-52.

Warren, S. F., & Rogers-Warren, A. K. (1980). Current Perspectives in Language Remediation. Education and Treatment of Children, 5, 133-153.

Warren, S. F., & Rogers-Warren, A. K. (Eds.) (1985). Teaching Functional Language. Austin, Tx.: Pro-Ed.

Whitehurst, G. J. (1979). The acquisition of meaning. In G. J. Whitehurst & B. Zimmerman (Eds.), The functions of language and cognition. New York: Academic Press.